

**What is claimed is:**

1. A mixer circuit comprising:

an amplification unit having an input terminal and an output terminal, and  
amplifying a signal applied to the input terminal to output it to the output terminal;

5 a mixing unit having first, second and third input terminals, and first and  
second output terminals, the mixing unit mixing signals respectively applied to the  
first and second input terminals with a signal applied to the third input terminal, to  
respectively output the mixed signals to the first and second output terminals;

10 a capacitor connected between the output terminal of the amplification unit  
and the third input terminal of the mixing unit; and

a current source for providing a specific quantity of current to the third input  
terminal of the mixing unit such that the quantity of current flowing through the  
third input terminal of the mixing unit is substantially larger than the quantity of  
current flowing through the amplification unit.

15 2. The mixer circuit according to claim 1, wherein the amplification unit  
includes:

an amplification element having a first terminal that forms the input terminal,  
a second terminal that forms the output terminal and a third terminal, wherein the  
20 quantity and direction of current flowing from the second terminal to the third  
terminal are varied on the basis of the level of a voltage applied to the first  
terminal;

a load impedance connected between the second terminal of the  
amplification element and a first voltage source; and

a degeneration impedance connected between the third terminal of the amplification element and a second voltage source.

3. The mixer circuit according to claim 2, wherein the amplification unit  
5 further includes a capacitor connected between the first and second terminals of the amplification element.

4. The mixer circuit according to claim 1, wherein the mixing unit includes:  
10 a first amplification element having a first terminal that forms the first input terminal, a second terminal that forms the first output terminal and a third terminal, wherein the quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of a voltage applied to the first terminal;  
15 a second amplification element having a first terminal that forms the second input terminal, a second terminal that forms the second output terminal, and a third terminal connected to the third terminal of the first amplification element to form the third input terminal, wherein the quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of the  
20 voltage applied to the first terminal; and  
first and second load impedances connected between the second terminals of the first and second amplification elements and a voltage source, respectively.

5. The mixer circuit according to claim 1, wherein the current source includes an LC resonance circuit.

6. A mixer circuit comprising:

5 an amplification unit having an input terminal and an output terminal, and amplifying a signal applied to the input terminal to output it to the output terminal;

a mixing unit having first, second and third input terminals, and first and second output terminals, the third input terminal being connected to the output terminal of the amplification unit, the mixing unit mixing signals respectively applied  
10 to the first and second input terminals with a signal supplied to the third input terminal, to respectively output the mixed signals to the first and second output terminals; and

a current source for providing a specific quantity of current to the third input terminal of the mixing unit.

15 7. The mixer circuit according to claim 6, wherein the amplification unit includes:

an amplification element having a first terminal that forms the input terminal, a second terminal that forms the output terminal and a third terminal, wherein the  
20 quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of a voltage applied to the first terminal; and

a degeneration impedance connected between the third terminal of the amplification element and a second voltage source.

8. The mixer circuit according to claim 7, wherein the amplification unit further includes a capacitor connected between the first and second terminals of the amplification element.

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9. The mixer circuit according to claim 6, wherein the mixing unit includes:

10 a first amplification element having a first terminal that forms the first input terminal, a second terminal that forms the first output terminal and a third terminal, wherein the quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of a voltage applied to the first terminal;

15 a second amplification element having a first terminal that forms the second input terminal, a second terminal that forms the second output terminal, and a third terminal connected to the third terminal of the first amplification element to form the third input terminal, wherein the quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of the voltage applied to the first terminal; and

20 first and second load impedances connected between the second terminals of the first and second amplification elements and a voltage source, respectively.

10. A mixer circuit comprising:

an amplification unit having an input terminal and an output terminal, and amplifying a signal applied to the input terminal to output it to the output terminal; and

a mixing unit having first, second and third input terminals, and first and second output terminals, the third input terminal being connected to the output terminal of the amplification unit, the mixing unit mixing signals respectively applied to the first and second input terminals with a signal applied to the third input terminal, to respectively output the mixed signals to the first and second output terminals,

wherein the amplification unit includes:

an amplification element having a first terminal that forms the input terminal, a second terminal that forms the output terminal and a third terminal, the quantity and direction of current flowing from the second terminal to the third terminal being varied on the basis of the level of a voltage applied to the first terminal;

a degeneration impedance connected between the third terminal of the amplification element and a second voltage source; and

a capacitor connected between the first and second terminals of the amplification unit.

11. The mixer circuit according to claim 10, wherein the mixing unit includes:

a first amplification element having a first terminal that forms the first input terminal, a second terminal that forms the first output terminal and a third terminal, wherein the quantity and direction of current flowing from the second terminal to

the third terminal are varied on the basis of the level of a voltage applied to the first terminal;

a second amplification element having a first terminal that forms the second input terminal, a second terminal that forms the second output terminal, and a third terminal connected to the third terminal of the first amplification element to form the third input terminal, wherein the quantity and direction of current flowing from the second terminal to the third terminal are varied on the basis of the level of the voltage applied to the first terminal; and

first and second load impedances connected between the second terminals of the first and second amplification elements and a voltage source, respectively.

12. The mixer circuit according to claim 11, wherein the mixing unit further includes each of capacitors which is connected between the first and second terminals of each of the first and second amplification elements.

13. A mixer circuit comprising:

an amplification unit having an input terminal and an output terminal, and amplifying a signal applied to the input terminal to output it to the output terminal; and

a mixing unit having first, second and third input terminals, and first and second output terminals, the third input terminal being connected to the output terminal of the amplification unit, the mixing unit mixing signals respectively applied to the first and second input terminals with a signal supplied to the third input

terminal, to respectively output the mixed signals to the first and second output terminals,

wherein the mixing unit includes:

5 a first amplification element having a first terminal that forms the first input terminal, a second terminal that forms the first output terminal and a third terminal, the quantity and direction of current flowing from the second terminal to the third terminal being varied on the basis of the level of a voltage applied to the first terminal;

10 a second amplification element having a first terminal that forms the second input terminal, a second terminal that forms the second output terminal, and a third terminal connected to the third terminal of the first amplification element to form the third input terminal, the quantity and direction of current flowing from the second terminal to the third terminal being varied on the basis of the level of the voltage applied to the first terminal;

15 first and second capacitors, the first capacitor being connected between the first and second terminals of the first amplification element, the second capacitor being connected between the first and second terminals of the second amplification element; and

20 first and second load impedances connected between the second terminals of the first and second amplification elements and a voltage source, respectively.